

Name: _____
Student ID: _____

Test 3

This test is graded out of 46 marks. No books, notes, graphing calculators or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Formulas:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right) \quad h = \frac{-b}{2a} \quad k = \frac{4ac - b^2}{4a}$$
$$I = Prt \quad S = P + I = P(1 + rt)$$
$$S = Pe^{rt} \quad FV = PV \left(1 + \frac{j}{m} \right)^{mt}$$

Question 1. (4 marks) Express the logarithm as the sum and difference of logarithms (with no powers on $(x+1)$, $(x+2)$ and $(x+3)$).

$$\log \left[\frac{(x+1)^3(x+2)^4}{(x+3)^2} \right]$$

Question 2. (4 marks) Sketch a graph of $f(x) = 3(2^x)$.

Question 3. Alex invests \$900 in a simple interest scheme at a rate of 4.25% per year for 7 months.

a. (2 marks) How much interest did Alex gain?

b. (2 marks) What is the future value of Alex's investment?

Question 4. (4 marks) Let $p = 2q^2 + 100q + 3600$ be the supply function for a product and $p = 500q - 2q^2$ be the demand function, find the market equilibrium.

Question 5. Let $p = -3x + 200$ be the price of a product, where p is the price x items are sold.

a. (2 marks) Find the revenue function.

b. (4 marks) Find the number of items sold that maximize the revenue function.

Question 6. (4 marks) What interest will be earned if \$9 000 is invested for 26 months at 6% compounded monthly.

Question 7. (4 marks) How long (*in years*) would \$5 000 have to be invested at 3%, compounded continuously, to amount to \$11 000.

Question 8. (4 marks) A sum of \$25 000 would have to be invested at what nominal interest rate, compounded quarterly, to amount to \$30 000 in 10 years.

Question 9. (4 marks) Sketch the graph of $f(x) = \log_4(x)$.

Question 10. Evaluate

a. (2 marks) $\log_4 16$

b. (2 marks) $\log_9 \frac{1}{9}$

Question 11. (4 marks) What amount needs to be invested in order to have \$8 500 in 265 days at a rate of 9.5% p.a.